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Shireen Samson
Principal, JSMP's
Maharashtra College of
Nursing, MIDC, Latur,
Maharashtra, India

Dr. Gajanand R Wale
Principal, KT Patil College of
Nursing, Osmanabad,
Maharashtra, India

A study to evaluate the impact of COVID-19 on pregnancy

Shireen Samson and Dr. Gajanand R Wale

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Abstract

COVID-19 is a new lung illness linked to significant disease and mortality in the elderly and those with concomitant conditions. Pregnant women, according to research, are much more sensitive to COVID-19 than non-pregnant women. Nevertheless, it's unknown how pregnant women are aware of COVID-19 and take precautions to avoid infection. A global pandemic has been triggered by Coronavirus Disease 2019 (COVID-19), which is triggered by acute respiratory syndrome (SARS syndrome coronavirus 2 (SARS-CoV-2)). The virus typically affects the lungs, causing mild to severe breathing difficulties. Nevertheless, there is overwhelming evidence that the virus has detrimental consequences on other systems components that have the ACE2 receptor, including the placenta. The number of kids born to SARS-CoV-2 infected women tests positive after delivery, implying that the placenta has defense functions. SARS-CoV-2 positive moms tend to have an increased risk of perinatal mortality problems, including miscarriage, foetal development restriction, or stillbirth. The pathobiology of COVID-19 maternal infection, as well as the potential negative effects of viral infection and the likelihood of variables into consideration transfer, are discussed in this paper.

Keywords: COVID-19, pregnancy, impact & regression analysis

Introduction

Coronavirus disease 2019 (COVID-19) is an emergent pulmonary disorder characterized by the coronavirus-2 (SARS-COV2), the only one, constructive reflects the internal acid (RNA) virus that causes acute respiratory syndrome (SARS Syndrome). With just an incubation period of 2–14 days following introduction to the virus, documented cases of COVID-19 commonly present with clinical manifestations of heat, chronic cough, fatigue, and breathlessness. Influenza can induce everything from a moderate respiratory infection to severe complications like respiratory failure, septicemia, and other metabolism and coagulation factors problems, as well as death. The majority of COVID-19-related deaths, particularly respiratory distress, happened in elderly individuals and those with underlying diseases. According to a systematic review, persons with hypertension, cardiac, and pulmonary organ dysfunction were the most susceptible categories related with COVID-19 mortality, according to a systematic review. Even as the COVID-19 epidemic unfolds, considerable concerns have been expressed concerning the virus's impact on pregnancy and the possibility of vertical transmission. According to recent findings, the risk of maternal mortality in COVID-19 pregnant women with severe illness appears to be considerable. There's really scant evidence of COVID-19 transfer from mother to kid during pregnancy. While some neonates tested negative for COVID-19 shortly after delivery, others came back positive after only just a few days. Nevertheless, it's unclear when the transmission happened (pre, peri, or postnatal) amongst infants who met the standards.

Early Chinese research found that only some children born to COVID-19 optimistic women were premature and had a premature birth, however, the data tying those results to the COVID-19 is ambiguous. Even though the effects of COVID-19 on pregnant women are unknown, pregnant women should be considered the highest population for developing COVID-19 preventative and control strategies.

- Persons who really are pregnant or previously expecting are much more likely to become severely unwell from COVID-19 than individuals who are not expecting, despite the fact that the total risks were low.
- COVID-19 infection during pregnancy raises the risk of problems that can harm the mother and the growing baby. COVID-19, for instance, raises the risk of producing a premature (before 37 weeks) or stillbirth infant throughout pregnancy.

Corresponding Author:
Shireen Samson
Principal, JSMP's
Maharashtra College of
Nursing, MIDC, Latur,
Maharashtra, India

Though COVID-19 vaccinations have become ready, it's indeed unclear whether they can stop the virus from spreading. As a result, implementing COVID-19 preventative measures is vital to the pandemic's control. As a result, complete lockdowns, contact tracing, and self-

isolation or isolation have indeed been deployed worldwide, as also the advocacy of public health programs including such hand hygiene, respiratory protocols, and social distance to slow the transmission of the infection.

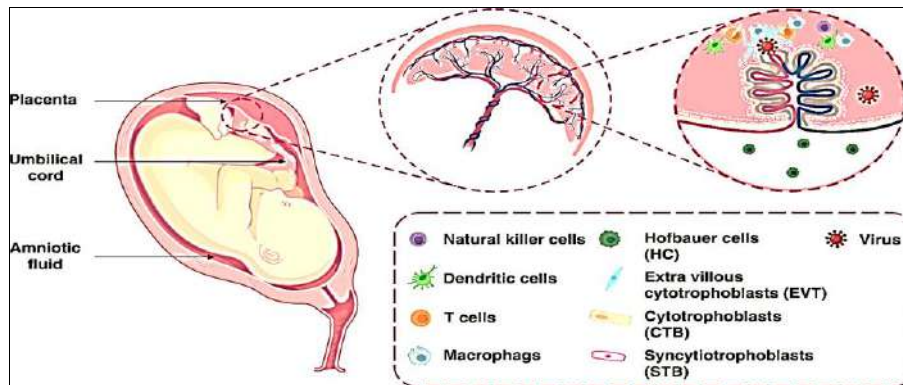


Fig 1: Showing of COVID-19 during Pregnancy

The focus of this research is to see how the COVID-19 epidemic affects expectant women and women's concerns about their own health, their partner's wellness, and the developing fetus. It also tries to figure out what other subgroups are more subject to increased health-related anxiety during an epidemic. And during the COVID-19 epidemic, a few research looked at pregnant women's sentiments of concern and worry. They were either qualitative research with a small group of subjects, small-scale surveys in a single country, or preference sampling in multiple nations. All of this suggests that the novel coronavirus has the ability to cause concern among pregnant women. However, only a few research had the opportunity to track a maternal community before the COVID-19 epidemic and detect actual changes. Research on 200 Italian women indicated that they had much higher levels of anxiety. Other research follows 63 Turkish women for a year and discovered substantial increases in anxiety and depression symptoms. Thus far, no research was done on the experiences of expectant women's spouses.

Literature Survey

The focus of this research was to give an understanding of the relation between COVID-19 and pregnancy based on the clinical presentations, maternal-perinatal outcome, and the potential of vertical transmission of infection. The majority of data on the influence of COVID-19 during the perinatal period came from the Bibliographic databases. The current research looked into a variety of topics. Initially, clinical manifestations were similar to those seen in the general public, with fever and cough being the most common side effects; however, the virus's course was shorter in general. In terms of infected persons, the existing research doesn't confirm the transfer of SARS-Cov-2 to the fetus, a few cases have been recorded with a case rate of less than 4%.^[11]

In author addresses the important information gained through vaccination clinical studies in women who were immunized but fell pregnant inadvertently during the study time. It also examines a variety of clinical routes for their management and suggests a drug development model for the pharmaceutical research community that is consistent with medical studies for vaccinations and therapeutic approaches.

The lengthy consequences of COVID-19 on the infant and mother are unknown. A clinical investigation supports our theory that COVID-19 gives rise pregnant women to preeclampsia or hypertension throughout childbirth, and that it may have long-term consequences for a woman's cardiovascular risk. This may raise a woman's chances of developing preeclampsia in later pregnancies. The abrupt implementation of COVID-19 has had a profound influence on many parts of the financial industry, particularly banks. This paper will not only utilize a multiple linear regression model to expound on the COVID-19 and other factors on big bank earnings, but it will also infer two remedies from three previous related articles that can help banks avoid losing money^[12, 13].

Medline was searched using a hybrid of computerized and human retrieval using Medline, EMBASE, and Science direct. The software Review Manager 5.3 has been used to analyze study variability and generate the cumulative significant changes (OR, 95CI). There was also a subgroups analysis, a scenario analysis, and a publishing bias test. With such a pooled OR of 1.98 (95 percent CI 1.39–2.82; $P = 0.0002$), we discovered a significant link between liver dysfunction and mortality in COVID-19 individuals. With a combined OR of 4.48 (95 percent CI 3.24–7.21; $P 0.001$) and a pooling WMD of 3.35 (95 percent CI 2.07 to 4.64; $P 0.001$), there had been a significant correlation between AST and COVID-19 severity^[14]. In 2018, 969 expecting women were recruited for the pre-pandemic cohort. In 2020, 1168 expecting women were recruited for the influenza cohort. Hospital notes were used to acquire demographic and socioeconomic variables, hormonal influences, characteristics of the pregnancy, and the pregnancy's outcome. The pre-pandemic cohort had a higher rate of Caesarean section births (adjusted odds ratio (OR) = 0.71, 95% of confidence interval (CI): 0.55–0.92). In the pre-pandemic group, birth weights of less than 2500 g and moreover 4000 g were more common (adjusted OR = 0.62, 95 percent CI: 0.41–0.93 for less than 2500 g and adjusted OR = 0.30, 95 percent CI: 0.20–0.46 for and over 4000 g). Breastfeeding exclusively after patient discharge was more common in the epidemic group than those in the pre-pandemic group (60 percent)^[15].

Another study aims to see how the Covid 19 epidemic has

affected pregnant women's willingness to return to antenatal treatment. The researcher employed stratified sampling with the Lemeshow algorithm with a sample size of 126 participants and the methodology determined by the researcher in this investigation. The research was analytic observational. Data was gathered using the observational test carried out, which was gathered both offline and online (Google Form). The Mann-Whitney test was employed in this investigation. The level of significance is 0.003 at the 2nd-trimester prenatal visit and 0.001 at the 3rd-trimester pregnant visit, indicating that $p < 0.05$ is statically important. There is a link between the pandemic's impact and its severity [16].

COVID-19 concentrates on the global rise of domestic and family violence as a health concern that exacerbates gender inequality. As even more persons have been put under house arrest, having to labor unpaid for about six hours a day, and women's duties have expanded as children's schools and support for families have closed, quarantines and other similar measures have increased women's workload and stress. It also creates physical and emotional abuse, which can lead to foetal mortality or birth defects. COVID-19 has also posed significant obstacles in border control, migration, and service issues, emphasizing the importance of humanitarian protection for families, individuals, and residency minors [17].

Limited adoption of RHS services, increased complaints of domestic violence, and, in certain cases, decreased access to health care and safe abortion care appear to be the result of home isolation and fears of getting the virus. Vulnerable populations, such as young folks, Indigenous peoples, refugees, and asylum seekers whose safety and care are neglected, are disproportionately impacted. High levels of unwanted pregnancy, unsafe abortion, and shorter pregnancy or within 42 days periods, and untreated sexual transmission illnesses have been predicted. The epidemic has also prompted the quick adoption of new technologies, as well as legal and regulatory changes, which have revolutionized and made it, particularly for some patients. Current proposals practices and even legislation have helped to reduce barriers to treatment that would have taken years of bureaucracy to overcome normally [18].

Older people, as well as those with actual disease diseases like heart disease, diabetes, chronic respiratory disease, any long-term illness, and cancers, are more susceptible to suffering life-threatening illnesses and accompanying consequences. An ectopic woman becomes pregnant when a fertilized ovum is implanted somewhere other than the uterine lining. Ectopic pregnancy is an existing situation with a high fatality rate. Regularly, diagnostic should begin not just with patients with suspected, but as well as with

substantiation from radiological findings that can aid in determining the next course of action. Females of reproductive years who arrive with lower abdominal pain or vaginal discharge and a missing period should be suspected of having an ectopic [19].

On March 22, 2020, Australia implemented lockdown steps to combat COVID-19. Americans were instructed to stay at home for 2 months and only leave for required activities. Researchers look into the implications for reproductive health (RH). Methodologies: From April 23 to May 11, 2020, Australians aged 18 and over were invited to take part in an online survey. Contraception use, reproductive intention, and accessibility to RH services were among the question posed. Researchers present the findings of a study including 518 women over the age of 50. Descriptive statistical analyses were used to examine pregnant intention and contraception use. To investigate the problems in gaining RHS goods and services, odds ratios and 95 percent confidence intervals were generated. The parametric thematic method was used to examine qualitative information. The majority of individuals (55.4%, or 287/518) were between the ages of 18 and 24 [20].

Materials and Methods

Multiple regression analysis is used for the prediction of the impact of COVID-19 among pregnant women through the symptoms over the day. Fig.2. show the variations from the whole set.

The equation that describes how the dependent variable y is related to the independent variables x_1, x_2, \dots, x_p and an error term is:

$$y = b_0 + b_1x_1 + b_2x_2 + \dots + b_px_p + e \tag{1}$$

Where, $b_0, b_1, b_2, \dots, b_p$ are the parameters, and e is a random variable called the error term

$$SST = SSR + SSE \tag{2}$$

Where,
 SST = total sum of squares
 SSR = sum of squares due to regression
 SSE = sum of squares due to error

Results Analysis and Discussion

Table.1. shows the maternal infection from Jan 25, 2020 to December 31, 2021 as per the CDC report.

Table 1: Statistical Results for Pregnant women during COVID-19

| Description | Outcomes |
|-------------|---------------------------------------------------|
| 71412 | Women with COVID-19 who completed pregnancy |
| 72450 | Birth outcomes among pregnant women with COVID-19 |
| 71871 | Live Born Infants |
| 579 | Pregnancy Losses |

Impact of COVID-19 on pregnant women: When contrasted to persons who do not have COVID-19 throughout pregnancy, persons with COVID-19 seem to be more likely to have difficulties that can harm their unwanted pregnancies and growing kids. COVID-19, for instance,

raises the chances of producing a premature (before 37 completed weeks of gestation) and stillborn baby throughout pregnancy. COVID-19 infection during pregnancy can potentially increase the risk of various pregnant problems. Information on birth outcomes comes from observational

studies and extensive sets of instances reported first before the Omicron variant became popular in late 2021. In non-pregnant women, Omicron has been linked to a lower risk of major illness than the prior Delta variation, however, there isn't yet enough evidence on its impact on fetal growth. According to preliminary results, contamination with the Delta variation during pregnancy is known to increase the risk of placenta malfunction and fetal impairment compared to infections with other variations.

Vertical transmission risk: The magnitude of infected persons (in utero, intrapartum, and early postnatal period) is unknown. Even though congenital disease accounts for fewer than 2% of all parental illnesses, there have only been a few such cases of possible in utero transmission recorded. Severe COVID-19, death, hospitalization to intensive care, and postnatal infection were all identified as pregnancy complications for mother-to-child transmission in a systematic study published in 2022. Transfer intrapartum or immediately after birth was related to 7 of the 14 verified mother-to-child diseases in this research. In prenatal distribution is usually by the hematoma pathway, although it can also be through the rising route. Viremia rates in COVID-19 patients appear to be modest (1 percent in one research, but greater in serious disease, and perhaps with the Delta variation, implying that placenta seed and in utero transfer are unlikely. This virus was discovered in a few cases, but most placentas investigated so far showed no signs of infection. At least four individuals with a positive vaginal swab and a patient with a good throat swab and fetal membranes have been documented, implying that infections via the ascending route and antenatal and postnatal transfer via touch with a vaginal lubricant are uncommon. However, because virus scattering in mother feces is widespread, fecal contamination of the perineum could conceivably be a source of intrapartum infection, even if there is no proof that cesarean delivery protects against transmitting. The postnatal transfer could happen via intake of milk or, more often, via pulmonary or other infected discharges from an

infected patient (or another caregiver) to the infant. Angiotensin-converting enzyme 2 receptor and serine protease TMPRSS2, which are marginally co-expressed in the placental, are believed to be required for SARS-CoV-2 cell entrance. This could explain why placental SARS-CoV-2 infections and fetal transmission are so rare. Despite necessitating placenta cell invasion, SARS-CoV-2 (or maternal) IgM could enter the fetus as a result of ischemia injury to the placental that disrupts the having implications barriers.

Humans might well make a clear prognosis of rare genetic infectious disease in birth to healthy neonates if SARS-CoV-2 is discovered by polymerase in umbilical cord blood or perinatal brain matter gathered within the first 12 hours after birth or excess fluid collected before membrane rupture in a mother with SARS-CoV-2 infectious disease. Others have given acceptance criteria. There have been no agreed criteria for concrete evidence of prenatal disease, which makes it difficult to diagnose prenatal transmission. SARS-CoV-2 infection should be distinguished into intrauterine (congenital) and postnatal infection using horizontal transfer parameters. Persons who are pregnant, breastfeeding, attempting to get expectant now, or who may become pregnant in the future should get the COVID-19 vaccine. Additionally, everybody who is suitable, even those who are pregnant, breastfeeding, attempting to conceive, or may have become pregnant before the age, should have a booster dose and keep their COVID-19 immunizations up to date. If you have concerns concerning getting the vaccine, speaking with your doctor may be beneficial, but it is not essential. Vaccination helps to prevent major diseases, hospitalization, and deaths. Those who have not yet been vaccinated against COVID-19 should do so as quickly as practicable and maintain masked. Women who have received their COVID-19 immunizations must use them to maximize their protection from variations and also to stop the diseases from spreading to everyone else.

Table 2: Precautions to be taken during COVID-19

| | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Throughout pregnancy, the incidence of serious coronavirus disease 2019 (COVID-19) is possibly higher than the overall community. |
| 2. | In pregnant, the risks for significant COVID-19 are the same as in the general population. |
| 3. | Highly transmissible is conceivable, but the mechanics remain unknown. Respiratory distress illness appears to be an uncommon occurrence. |
| 4. | Glucocorticoids usage during pregnancy for suspected premature births is considered to be safe for the woman, and corticosteroid use for adverse pregnancy illnesses could be helpful. |
| 5. | Physicians should use a low bar for thromboprophylaxis and assessment of probable thrombotic events in moms with COVID-19. |
| 6. | If a woman has COVID-19, she must be urged to breastfeed if she is able, and she should do so while wearing protective clothing. |
| 7. | COVID-19 asymptomatic in pregnant seems to be prevalent, although its clinical relevance is unknown. |
| 8. | Physicians should be aware of the pandemic's broader consequences and ensure that psychiatric stress and domestic violence are screened wherever feasible. |

Conclusion

Even though a large number of women had a sufficient understanding of COVID-19, only around half of them followed good COVID-19 prevention procedures. Pregnant women should indeed be educated about COVID-19 prevention methods at health institutions, whereas water, sanitation, and hygiene should be improved, especially in remote areas.

During the coronavirus disease 2019 (COVID-19) epidemic, there are several unanswered questions for pregnant women. Pregnant women are now regarded as particularly sensitive

toward severe SARS-CoV-2 infection based on the clinical experience with women affected by infections by other coronaviruses, such as acute respiratory syndrome (SARS Syndrome (SARS) and Middle Eastern Respiratory Syndrome. The immune response, circulatory tract, cardiovascular function, and anticoagulation are all affected by physiological changes that occur. These could have a good or negative impact on the progression of the COVID-19 condition. The consequences of SARS-CoV-2 on the implant, foetal development and growth, labor, and newborn health have yet to be determined, and a concentrated, global

effort is needed to find out. Symptomless illness adds to the difficulty of providing services, preventing infection, and managing it. Aside from the disease's direct effects, the pandemic has several indirect effects on maternity care, such as decreased access to safe abortion care, significant mental health strain, and greater economic disadvantage. In this study, we look at what we know about COVID-19 during pregnancy and where additional study is needed to reduce the risk to mothers and babies.

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